



DIRECT BOND COPPER & ACTIVE METAL BRAZE

HIGH-POWER, HIGH-VOLTAGE, COST EFFECTIVE & RELIABLE DIRECT BOND COPPER & ACTIVE METAL BRAZE SOLUTIONS

Remtec provides high-voltage and high-current Direct Bond Copper (DBC) and Active Metal Braze (AMB) solutions for automotive, rail, plasma generation, etching equipment, heaters, electric vehicles (EV), and other wide applications. DBC and AMB solutions are realized as single layer boards; multilayer dielectric ceramic circuits with 6-8 conductor layers, ground planes, hermetic plugged and plated vias (e.g., interlayer blind, partial through, and PTV® power/thermal vias); and as printed resistors on Alumina, Aluminum Nitride and Silicon Nitride.

Copper conductor layer thickness ranges from 5 mil to 12 mil. Boards are plated with gold and other custom plating for excellent wire bondability, solderability, and conductor adhesion. And multilayer circuit boards utilize silver interlayer conductors on inner dielectric layers and outer layers that may be gold plated.

EXAMPLE SOLUTION: HIGH-POWER APPLICATIONS

Remtec's DBC solutions (on alumina/Al₂O₃ or aluminum nitride/AlN) and AMB products (on Silicon Nitride/Si₃N₄) are excellent options for high-power applications. By varying copper and ceramic thickness and ceramic type, our DBC substrates (in particular) achieve better CTE match with semiconductors – such as Silicon (Si), Gallium Nitride (GaN) and Gallium Arsenide (GaAs) and packages. Other benefits include:

- High-purity bonded copper film on ceramic provides superior thermal conductivity, current capacity and heat dissipation.
- Optional dimple features significantly increase thermal cycling reliability by reducing thermal stresses.
- Versatile copper finish options ensure excellent solderability, withstanding multiple soldering and braze operations from 180–800°C, without any degradation.
- Ni-Au, Pd and Ag plating finishes enable a broad range of economical assembly techniques, including SMT soldering, sintering low- and high-temperature die attach, Al and Au wire, and ribbon bonding.
- Power Transfer Via (PTV®) technology enables interconnects on both sides of DBC and AMB substrates with PTV® Cu plugged or plated through holes for higher current carrying capacity.
- DBC and AMB on Si₃N₄ are available for lower quantity orders other manufacturers would not entertain.

ABOUT REMTEC

Remtec is a leading supplier of microelectronic, RF, microwave, and submount thick film printed circuits on ceramic boards and packages utilized in wireless, industrial, radar, IoT, optoelectronics, medical, space, and defense markets. Based in Canton, MA, we have a 35-year legacy with extensive design, development, engineering, and production capabilities – specializing in high-mix and low- to mid-volume production. Product integrity, reliability, and repeatability are assured by state-of-the-art equipment and processes (e.g., automated cassette-to-cassette screen printing and firing, high speed step and repeat laser trimming, photolithography and dicing) – as well as robust material analysis, wide use of SPC methodology, and adherence to applicable military, space, and commercial standards such as MIL-STD, ANSI, IPC, and others.



TECHNICAL SPECIFICATIONS

Master Card Size

7.5" x 5.5"; Usable Cu Area: 7.008 x 5.000"

Front-to-Back Registration

+ 0.008"

Ceramic Perimeter Tolerance

+ 0.008" / - 0.002" - laser scribed
±.002" - diamond sawn

Thickness Tolerance

+7% / -10% Ceramic/Copper
total stackup

Minimum Cu Pullback from Ceramic Edge

0.020" ± 0.008"

Copper Surface Finish

Ni - 80-400 μ", Pd 2-15 μ",
Au 0.4-50 μ", Ag 4-12 μ"

COPPER THICKNESS

	Substrate Thickness, (mil)	Metalization Thickness (mil)			
		5	8	10	12
Alumina (Al₂O₃)	10	•	•		•
	15	•	•		•
	25	•	•		•
	40	•	•	•	•
Aluminum Nitride (AlN)	15	•	•		•
	25	•	•		•
	40	•	•	•	•
Silicon Nitride (Si₃N₄)	12.5				•

Other configurations may be available upon request.

SURFACE ROUGHNESS

R_{max} ≤ 50 μm, R_a ≤ 3 μm

R_z ≤ 16 μm

Lower roughness upon request.

Cu ETCHING TOLERANCES

Copper Thickness <	Line	Space
.005"	+ 0.005"	+ 0.004"
.008"	+ 0.006"	+ 0.004"
.010"	+ 0.008"	+ 0.006"
.012"	+ 0.008"	+ 0.006"

PROCESS CONSIDERATIONS

Copper Thickness ≤	Line	Space	Pitch
.005" Nominal	.012"	.012"	.024"
.005" Minimum	.010"	.010"	.020"
.008" Nominal	.020"	.020"	.040"
.008" Minimum	.016"	.016"	.032"
.010" Nominal	.028"	.028"	.056"
.010" Minimum	.020"	.020"	.040"
.012" Nominal	.028"	.028"	.056"
.012" Minimum	.020"	.020"	.040"

ADDITIONAL

Solderability

Excellent with Pb-Sn, Sn-Ag-Cu, Au-Sn, Au-Ge, CuSil and others.

Wire Bondability

Excellent with .003"-.020" Al wire and .0013-.002" gold wire and ribbon.

Copper Peel Strength

≥4.0N/mm @50mm/min @ Cu-thickness 0.3mm on A/203

Operation Temperature

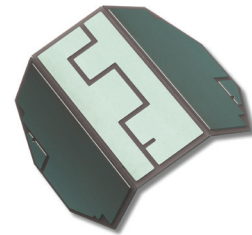
-55°C to +85°C (consult factory for details)

Additional Features

Selective plating, patterned solder mask laser ablation solder control, step etching are available.



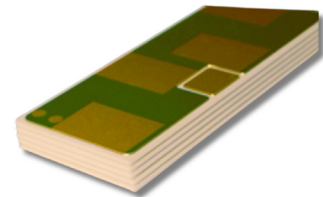
Custom ceramic with attached leads



Custom ceramic, 3D structure



Substrate examples with various metalization



Substrate examples with stack up



Visit remtec.com, call 781-762-9191, or email sales@remtec.com to initiate a quote.